

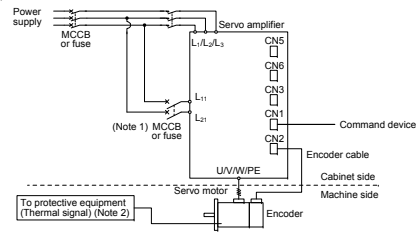
(11) Over-temperature protection for motor

Motor Over temperature sensing is not provided by the drive. Integral thermal protection(s) is necessary for motor and refer to chapter 3 (12) for the proper connection.

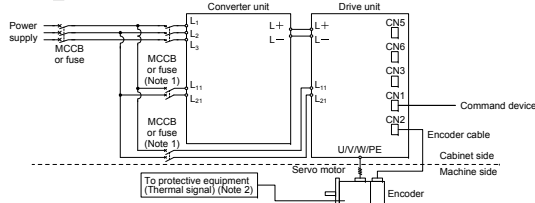
(12) Figure configuration

Representative configuration example to conform to the UL/cUL standard is shown below. The earth wiring is excluded from the figure configuration.

(a) MR-J3-22K□ or less



(b) MR-J3-DU30K□ or more



Note 1. When the wire sizes of L₁ and L₂ are the same, MCCB or fuse is not required.
2. Please use a thermal sensor, etc. for thermal protection of the servo motor.

The control circuit connectors described by rectangles are safely separated from the main circuits described by circles.

4. SOUTH KOREA COMPLIANCE

This product complies with the Radio Wave Law (KC mark). Please note the following to use the product.

이 기기는 업무용 (A급) 전자파합격기로서 판매 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

(The product is for business use (Class A) and meets the electromagnetic compatibility requirements. The seller and the user must note the above point, and use the product in a place except for home.)

5. INSPECTION

WARNING

- Before starting maintenance and/or inspection, turn off the power and wait 15 minutes or more (wait more than 20 minutes in the case of the drive unit is 30kW or more) until the charge lamp goes off. Then, confirm the voltage between P(+) and N(-) (between L+ and L- in the case of the drive unit is 30kW or more) is safe with a voltage tester and others to prevent an electric shock. In addition, always confirm from the front of the servo amplifier (converter unit), whether the charge lamp is off or not.
- To avoid the risk of electric shock, only qualified personnel should attempt inspections. For repair and parts replacement, contact your local sales office.

CAUTION

- Do not perform insulation resistance test on the servo amplifier (drive unit) as damage may result.
- Do not disassemble and/or repair the equipment on customer side.

(1) Inspection

It is recommended to make the following checks periodically.

- Check for loose terminal block screws. Retighten any loose screws.
- Check the cables and the like for scratches and cracks. Perform periodic inspection according to operating conditions.
- Check that the connector is securely connected to the servo amplifier.
- Check that the wires are not coming out from the connector.
- Check for dust accumulation on the servo amplifier.
- Check for unusual noise generated from the servo amplifier.

(2) Life

The following parts must be changed periodically as listed below. If any part is found faulty, it must be changed immediately even when it has not yet reached the end of its life, which depends on the operating method and environmental conditions.

For use in the atmosphere having much oil mist, dust, etc., clean and inspect every three months.

For parts replacement, please contact your sales representative.

	Part name	Standard life
Converter unit and Servo amplifier (drive unit)	Smoothing capacitor	10 years
	Relay	Number of power-on and number of emergency stop times* 100,000 times
	Cooling fan	10,000 to 30,000 hours (2 to 3 years)
	Absolute position battery	Refer to the MR-J3-□ Servo Amplifier Instruction Manual.

(a) Smoothing capacitor

Affected by ripple currents, etc. and deteriorates in characteristic. The life of the capacitor greatly depends on ambient temperature and operating conditions. The capacitor will reach the end of its life in 10 years of continuous operation in normal air-conditioned environment (Surrounding air temperature of 40°C (104°F) or less).

(b) Relays

Their contacts will wear due to switching currents and contact faults occur. Relays reach the end of their life when the cumulative number of power-on and emergency stop times is 100,000, which depends on the power supply capacity.

(c) Converter unit and servo amplifier (drive unit) cooling fan

The cooling fan bearings reach the end of their life in 10,000 to 30,000 hours. Normally, therefore, the fan must be changed in a few years of continuous operation as a guideline. It must also be changed if unusual noise or vibration is found during inspection.

6. ALARMS AND WARNINGS

For details on each type of alarms or warnings, refer to each servo amplifier technical instruction.

● Safety Instructions ●

Please read the instructions carefully before using the equipment.

Install, and peruse all this guide and attached documents before the drive and maintenance and the check. After that, use these correctly. Use it after it is skilled of the knowledge of the equipment, information on safety, and all of notes. In this guide, the safety instruction levels are classified into "WARNING" and "CAUTION".

WARNING

Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.

CAUTION

Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight injury to personnel or may cause physical damage.

Note that the CAUTION level may lead to a serious consequence according to conditions. Please follow the instructions of both levels because they are important to personnel safety. What must not be done and what must be done are indicated by the following diagrammatic symbols.

⊘: Indicates what must not be done. For example, "No Fire" is indicated by ⊘.

●: Indicates what must be done. For example, grounding is indicated by ●.

In this guide, instructions at a lower level than the above, instructions for other functions, and so on are classified into "POINT". After reading this guide, always keep it accessible to the operator.

1. To prevent electric shock, note the following

WARNING

- Before wiring or inspection, turn off the power and wait 15 minutes or more (wait more than 20 minutes in the case of the drive unit is 30kW or more) until the charge lamp goes off. Then, confirm the voltage between P(+) and N(-) (between L+ and L- in the case of the drive unit is 30kW or more) is safe with a voltage tester and others to prevent an electric shock. In addition, always confirm from the front of the servo amplifier (converter unit), whether the charge lamp is off or not.
- Connect the converter unit and servo amplifier (drive unit) and servo motor to ground.
- Any person who is involved in wiring and inspection should be fully competent to do the work.
- Do not attempt to wire the converter unit and servo amplifier (drive unit) and servo motor until they have been installed. Otherwise, it may cause an electric shock.
- Operate the switches with dry hand to prevent an electric shock.
- The cables should not be damaged, stressed loaded, or pinched. Otherwise, it may cause an electric shock.
- During power-on or operation, do not open the front cover. Otherwise, it may cause an electric shock.
- Do not operate the converter unit and servo amplifier (drive unit) with the front cover removed. High-voltage terminals and charging area are exposed and it may cause an electric shock.
- Except for wiring or periodic inspection, do not remove the front cover even if the power is off. The converter unit and servo amplifier (drive unit) are charged and it may cause an electric shock.
- To prevent an electric shock, always connect the protective earth (PE) terminal (marked ⊕) of the converter unit and servo amplifier (drive unit) to the protective earth (PE) of the cabinet.
- When using a residual current device (RCD), select type B.
- To avoid an electric shock, insulate the connections of the power supply terminals.

2. To prevent fire, note the following

CAUTION

- Install the converter unit and servo amplifier (drive unit), servo motor and regenerative resistor on incombustible material. Installing them directly or close to combustibles will lead to smoke or a fire.
- Always connect a magnetic contactor between the main circuit power supply and L₁, L₂, and L₃ of the converter unit, servo amplifier, and configure the wiring to be able to shut down the power supply on the side of the converter unit, servo amplifier's power supply. If a magnetic contactor is not connected, continuous flow of a large current may cause smoke or a fire when the converter unit or servo amplifier (drive unit) malfunctions.
- Always connect a molded-case circuit breaker, or a fuse to each servo amplifier between the power supply and the main circuit power supply (L₁, L₂, and L₃) of the servo amplifier (including converter unit), in order to configure a circuit that shuts down the power supply on the side of the servo amplifier's power supply. If a molded-case circuit breaker or fuse is not connected, continuous flow of a large current may cause smoke or a fire when the servo amplifier malfunctions.
- When a regenerative resistor is used, use an alarm signal to switch main power off. Otherwise, a regenerative transistor malfunction or the like may overheat the regenerative resistor, causing smoke or a fire.
- Provide adequate protection to prevent screws and other conductive matter, oil and other combustible matter from entering the converter unit, servo amplifier (drive unit) and servo motor.

3. To prevent injury, note the following

CAUTION

- Only the voltage specified in the instruction manual should be applied to each terminal. Otherwise, a burst, damage, etc. may occur.
- Connect the terminals correctly to prevent a burst, damage, etc.
- Ensure that polarity (+, -) is correct. Otherwise, a burst, damage, etc. may occur.
- Take safety measures, e.g. provide covers, to prevent accidental contact of hands and parts (cables, etc.) with the converter unit and servo amplifier (drive unit) heat sink, regenerative resistor, servo motor, etc. since they may be hot while power is on or for some time after power-off. Their temperatures may be high and you may get burnt or a parts may be damaged.
- During operation, never touch the rotating parts of the servo motor. Otherwise, it may cause injury.

4. Additional instructions

The following instructions should also be fully noted. Incorrect handling may cause a fault, injury, electric shock, fire, etc.

(1) Transportation and installation

CAUTION

- Transport the products correctly according to their mass.
- Stacking in excess of the specified number of products is not allowed.
- Do not carry the servo motor by holding the cables, shaft, encoder or connector.
- Do not hold the front cover to transport the converter unit and servo amplifier (drive unit). The converter unit and servo amplifier (drive unit) may drop.
- Install the converter unit and servo amplifier (drive unit) in a load-bearing place in accordance with the instruction manual.
- Do not get on or put heavy load on the equipment.
- The converter unit, servo amplifier (drive unit) and servo motor must be installed in the specified direction.
- Leave specified clearances between the converter unit, servo amplifier (drive unit) and control enclosure walls or other equipment.
- Do not install or operate the converter unit, servo amplifier (drive unit) and servo motor which has been damaged or has any parts missing.

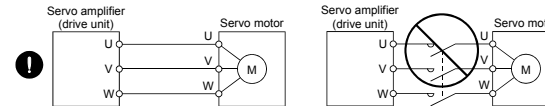
CAUTION

- Do not block the intake and exhaust areas of the converter unit, servo amplifier (drive unit) and servo motor with a cooling fan. Otherwise, it may cause a malfunction.
- Do not drop or strike converter unit, servo amplifier (drive unit) and servo motor. Isolate from all impact loads.
- When storing or using the converter unit, servo amplifier (drive unit) and servo motor, comply with the environmental conditions given in the Servo Amplifier Instruction Manual and Servo Motor Instruction Manual.
- Securely attach the servo motor to the machine. If attach insecurely, the servo motor may come off during operation.
- The servo motor with reduction gear must be installed in the specified direction to prevent oil leakage.
- Take safety measures, e.g. provide covers, to prevent accidental access to the rotating parts of the servo motor during operation.
- Never hit the servo motor or shaft, especially when coupling the servo motor to the machine. Otherwise, the encoder may malfunction.
- Do not subject the servo motor shaft to more than the permissible load. Otherwise, the shaft may break.
- When the equipment has been stored for an extended period of time, contact your local sales office.
- When treating the converter unit and servo amplifier (drive unit) be careful about the edged parts such as the corners of the converter unit and servo amplifier (drive unit).
- The converter unit and servo amplifier (drive unit) must be installed in the metal cabinet.
- When fumigants that contain halogen materials such as fluorine, chlorine, bromine, and iodine are used for disinfecting and protecting wooden packaging from insects, they cause malfunction when entering our products. Please take necessary precautions to ensure that remaining materials from fumigant do not enter our products, or treat packaging with methods other than fumigation (heat method). Additionally, disinfect and protect wood from insects before packing products.

(2) Wiring

CAUTION

- Wire the equipment correctly and securely. Otherwise, the servo motor may operate unexpectedly.
- Do not install a power capacitor, surge killer or radio noise filter (FR-BIF (-H) option) between the servo motor and servo amplifier (drive unit).
- Connect the servo amplifier (drive unit) power output (U, V, and W) to the servo motor power input (U, V, and W) directly. Not doing so may cause unexpected operation.
- Connect the servo motor power terminal (U, V, W) to the servo motor power input terminal (U, V, W) directly. Do not let a magnetic contactor, etc. intervene. Otherwise, it may cause a malfunction.



- Do not connect AC power directly to the servo motor. Otherwise, it may cause a malfunction.
- The surge absorbing diode installed to the DC relay for control output should be fitted in the specified direction. Otherwise, the emergency stop and other protective circuits may not operate.

Servo amplifier (drive unit)

Control output signal

DICOM

For sink output interface

Servo amplifier (drive unit)

Control output signal

DICOM

For source output interface

(3) Test run adjustment

CAUTION

- When the cable is not tightened enough to the terminal block (connector), the cable or terminal block (connector) may generate heat because of the poor contact. Be sure to tighten the cable with specified torque.
- Before operation, check the parameter settings. Improper settings may cause some machines to perform unexpected operation.
- The parameter settings must not be changed excessively. Operation will be instable.

(4) Usage

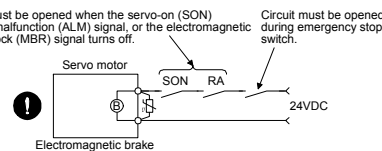
CAUTION

- Provide an external emergency stop circuit to ensure that operation can be stopped and power switched off immediately.
- Any person who is involved in disassembly and repair should be fully competent to do the work.
- Before resetting an alarm, make sure that the run signal of the servo amplifier (drive unit) is off to prevent an accident. A sudden restart is made if an alarm is reset with the run signal on.
- Do not modify the equipment.
- Use a noise filter, etc. to minimize the influence of electromagnetic interference, which may be caused by electronic equipment used near the servo amplifier (drive unit).
- Use the converter unit and servo amplifier (drive unit) with the specified servo motor.
- The electromagnetic brake on the servo motor is designed to hold the motor shaft and should not be used for ordinary braking.
- For such reasons as service life and mechanical structure (e.g. where a ball screw and the servo motor are coupled via a timing belt), the electromagnetic brake may not hold the motor shaft. To ensure safety, install a stopper on the machine side.
- Burning or breaking a converter unit and servo amplifier (drive unit) may cause a toxic gas. Do not burn or break a converter unit and servo amplifier (drive unit).

(5) Corrective actions

CAUTION

- When it is assumed that a hazardous condition may take place at the occur due to a power failure or a product fault, use a servo motor with electromagnetic brake or an external brake mechanism for the purpose of prevention.
- Configure a circuit so that the electromagnetic brake activates with the external emergency stop switch at the same time.



- When any alarm has occurred, eliminate its cause, ensure safety, and deactivate the alarm before restarting operation.
- Design the machine in order to avoid sudden restarting in case of after an instantaneous power failure.

(6) Maintenance, inspection and parts replacement

CAUTION

- With age, the electrolytic capacitor of the converter unit and servo amplifier (drive unit) will deteriorate. To prevent a secondary accident due to a fault, it is recommended to replace the electrolytic capacitor every 10 years when used in general environment. Please contact your local sales office.
- When using a converter unit and servo amplifier (drive unit) whose power has not been turned on for a long time, contact your local sales office.

(7) General instruction

- To illustrate details, the equipment in the diagrams of this guide and instruction manual may have been drawn without covers and safety guards. When the equipment is operated, the covers and safety guards must be installed as specified. Operation must be performed in accordance with this guide and instruction manual.

● DISPOSAL OF WASTE ●

Please dispose a converter unit, servo amplifier (drive unit), battery (primary battery) and other options according to your local laws and regulations.

EEP-ROM life

The number of write times to the EEPROM, which stores parameter settings, etc., is limited to 100,000. If the total number of the following operations exceeds 100,000, the servo amplifier and/or converter unit may fail when the EEPROM reaches the end of its useful life.

- Writing to the EEPROM due to parameter setting changes
- Home position setting in the absolute position detection system
- Writing to the EEPROM due to device changes

Battery transportation

MR-J3BAT contains a lithium metal battery, ER6. MR-J3BAT is not subject to the dangerous goods (Class 9) of the UN Recommendations.

To transport lithium metal batteries and lithium metal batteries contained in equipment by means of transport subject to the UN Recommendations, take actions to comply with the following regulations: the United Nations Recommendations on the Transport of Dangerous Goods, the Technical Instruction (ICAO-TI) by the International Civil Aviation Organization (ICAO), and the International Maritime Dangerous Goods Code (IMDG Code) by the International Maritime Organization (IMO).

To transport the batteries, check the latest standards or the laws of the destination country and take actions.

For more information, contact your local sales office.

Warranty

1. Warranty period and coverage

We will repair any failure or defect hereinafter referred to as "failure" in our FA equipment hereinafter referred to as the "Product" arisen during warranty period at no charge due to causes for which we are responsible through the distributor from which you purchased the Product or our service provider. However, we will charge the actual cost of dispatching our engineer for an on-site repair work on request by customer in Japan or overseas countries. We are not responsible for any on-site readjustment and/or trial run that may be required after a defective unit are repaired or replaced.

[Term]

The term of warranty for Product is twelve (12) months after your purchase or delivery of the Product to a place designated by you or eighteen (18) months from the date of manufacture whichever comes first ("Warranty Period"). Warranty period for repaired Product cannot exceed beyond the original warranty period before any repair work.

[Limitations]

- You are requested to conduct an initial failure diagnosis by yourself, as a general rule. It can also be carried out by us or our service company upon your request and the actual cost will be charged. However, it will not be charged if we are responsible for the cause of the failure.
- This limited warranty applies only when the condition, method, environment, etc. of use are in compliance with the terms and conditions and instructions that are set forth in the instruction manual and user manual for the Product and the caution label affixed to the Product.
- Even during the term of warranty, the repair cost will be charged on you in the following cases:
 - a failure caused by your improper storing or handling, carelessness or negligence, etc., and a failure caused by your hardware or software problem
 - a failure caused by any alteration, etc. to the Product made on your side without our approval
 - a failure which may be regarded as avoidable, if your equipment in which the Product is incorporated is equipped with a safety device required by applicable laws and has any function or structure considered to be indispensable according to a common sense in the industry
 - a failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and replaced
 - any replacement of consumable parts (battery, fan, smoothing capacitor, etc.)
 - a failure caused by external factors such as inevitable accidents, including without limitation fire and abnormal fluctuation of voltage, and acts of God, including without limitation earthquake, lightning and natural disasters
 - a failure generated by an unforeseeable cause with a scientific technology that was not available at the time of the shipment of the Product from our company
 - any other failures which we are not responsible for or which you acknowledge we are not responsible for

2. Term of warranty after the stop of production

- We may accept the repair at charge for another seven (7) years after the production of the product is discontinued. The announcement of the stop of production for each model can be seen in our Sales and Service, etc.
- Please note that the Product (including its spare parts) cannot be ordered after its stop of production.

3. Service in overseas countries

Our regional FA Center in overseas countries will accept the repair work of the Product. However, the terms and conditions of the repair work may differ depending on each FA Center. Please ask your local FA center for details.

4. Exclusion of responsibility for compensation against loss of opportunity, secondary loss, etc. Whether under or after the term of warranty, we assume no responsibility for any damages arisen from causes for which we are not responsible, any losses of opportunity and/or profit incurred by you due to a failure of the Product, any damages, secondary damages or compensation for accidents arisen under a specific circumstance that are foreseen or unforeseen by our company, any damages to products other than the Product, and also compensation for any replacement work, readjustment, start-up test run of local machines and the Product and any other operations conducted by you.

5. Change of Product specifications

Specifications listed in our catalogs, manuals or technical documents may be changed without notice.

6. Application and use of the Product

- For the use of our General-Purpose AC Servo, its applications should be those that may not result in a serious damage even if any failure or malfunction occurs in General-Purpose AC Servo, and a backup or fail-safe function should operate on an external system to General-Purpose AC Servo when any failure or malfunction occurs.
- Our General-Purpose AC Servo is designed and manufactured as a general purpose product for use at general industries. Therefore, applications substantially influential on the public interest for such as atomic power plants and other power plants of electric power companies, and also which require a special quality assurance system, including applications for railway companies and government or public offices are not recommended, and we assume no responsibility for any failure caused by these applications when used. In addition, applications which may be substantially influential to human lives or properties for such as airlines, medical treatments, railway service, incineration and fuel systems, man-operated material handling equipment, entertainment machines, safety machines, etc. are not recommended, and we assume no responsibility for any failure caused by these applications when used. We will review the acceptability of the abovementioned applications, if you agree not to require a specific quality for a specific application. Please contact us for consultation.